OPERATING SUMMARY

MIDLAND

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JUN 1 5 1973

MIG STRY OF THE ENVIRONMENT

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Ministry of the Environment

135 St. Clair Avenue West Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D. S. Caverly,

Assistant Deputy Minister.

D.A. McTavish, P. Eng.,

Director,

Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

MINISTER Honourable James A.C. Auld

DEPUTY MINISTER E. Biggs

ASSISTANT DEPUTY MINISTER D.S. Caverly

EXECUTIVE DIRECTOR K.H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR D. A. McTavish

ASSISTANT DIRECTOR C.W. Perry

REGIONAL SUPERVISOR P. J. Osmond

OPERATIONS ENGINEER
A. Clark

135 St. Clair Avenue West Toronto 195

MIDLAND WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF MIDLAND

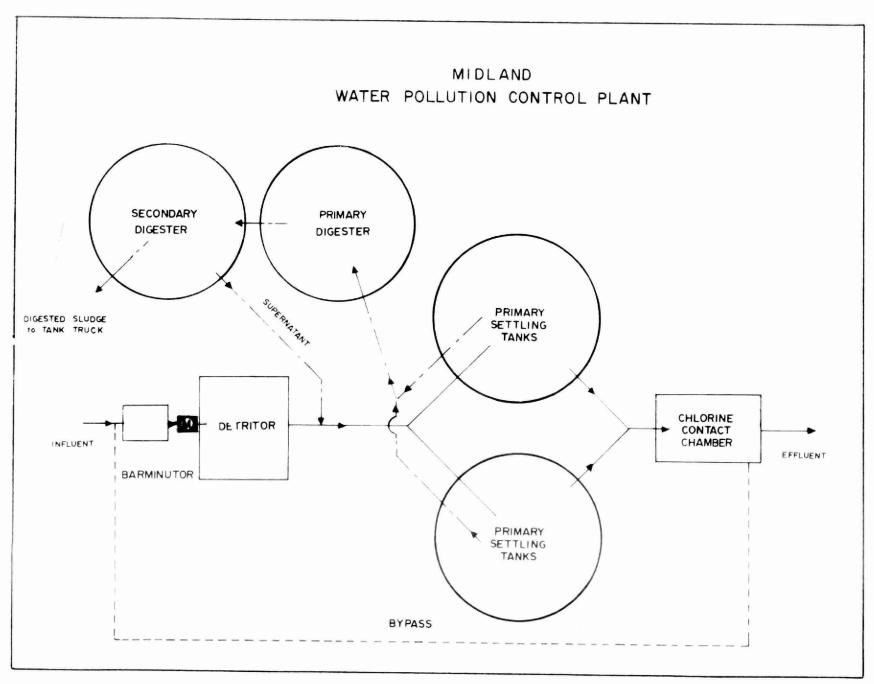
by the

MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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DESIGN DATA

PROJECT NO.	2-0146-63	PRIMARY TREATMENT
TREATMENT	Primary	Comminution
DESIGN FLOW	1.25 mgd	Type: Barminutor Size: One Model C
DESIGN POPULATION	12,500	Grit Removal
BOD - Raw Sewage - Removal	225 mg/1 40%	Type: Dorr Detritor Size: One 12' x 12' x 16''
SS - Raw Sewage - Removal	300 mg/l 60%	(1,200 gal) Retention: 1.38 min
		Primary Sedimentation
4		Type: Dorr Size: Two 50' dia x 8' swd 195,000 gal) Retention: 3.75 hours Loading: Surface, 319 gal/ft²/day Weir, 3970 gal/ft/day
		CHLORINATION
		Type: W & T, Type A711 (Auto) Size: One 1000 lb/day
		Chlorine Contact Chamber
		Size: Irregular (16, 200 gal) Retention: 18.7 min
		OUTFALL
		615' of 24" pipe to Georgian Bay

SLUDGE HANDLING

Digestion System - Two Stage

Primary --

Type: Babcock-Wilson Draft tube mixers (2)

Size: One 30' dia x 22' (15, 600 cu ft or 97, 200 gal) Loading: 4.3 lb/cu ft/mo

Loading. 4. 5 15/ cd 1t/ ii

Secondary --

Type: Fixed steel cover

Size: One 30' dia x $21\frac{1}{2}$ ' (15, 200

cu ft or 94,600 gal)
Total Loading: 2.2 lb/cu ft/mo

PUMPING STATIONS

#1 Pumping Station

Type: Worthington Size: Two 780 gpm @ 37' tdh

One 2600 gpm @ 60' tdh

#2 Pumping Station

Type: Flygt (submersible) Size: Two 83 gpm @ 30' tdh

72 Review

GENERAL

The Midland sewage project consists of a 1.25 mgd primary water pollution control plant and two pumping stations. Plant staff also operate two Town-owned pumping stations. The sewage collection system is operated by the municipality.

Plant effluent is discharged to a storm sewer which enters Midland Bay via a submerged outfall. Sludge is digested anaerobically and hauled by tank truck for land disposal.

EXPENDITURES

The 1972 operating costs were \$43,146.33, an increase of 14 percent over the previous year. The unit cost of operation was \$79 per million gallons treated as compared to \$74 in 1971, an increase of 7 percent.

PLANT FLOWS AND CHLORINATION

During the year a total of 547 million gallons of sewage was treated at the plant. Flows averaged 1.5 mgd and exceeded plant design capacity 75 percent of the time. Plant flows have increased considerably during the past two years, from the 1.1 mgd level in 1970. Peak flows during 1972 reached a high of 5.8 mgd as compared to the previous peak of 5.1 mgd in 1971.

A total of 34, 600 pounds of chlorine was used during the year at an average dosage of 6.3~mg/l to maintain a chlorine residual of at least 0.5~mg/l in the final effluent after 15 minues contact. During the latter months of the year, the chlorine dosage was increased slightly to provide a residual of 1.0~mg/l in order to improve the bacterial kill in the plant effluent.

PLANT EFFICIENCY

The raw sewage BOD averaged 105 mg/l and the raw sewage suspended solids averaged 223 mg/l during the year, both relatively unchanged from the previous year. The plant effluent BOD averaged 70 mg/l for a reduction of 33 percent and the plant effluent suspended solids averaged 80 mg/l for a reduction of 64 percent, both again similar to the previous year and reasonable in comparison to other primary plants.

The raw sewage phosphorus averaged 22 mg/l and the effluent averaged 19 mg/l. The level of phosphorus in the raw sewage is high and the removal efficiency in the plant is low in comparison to other primary plants. Phosphorus levels in raw sewage are normally in the range of 6 to 10 mg/l and removal efficiencies without the addition of chemicals to aid the removal of this material are commonly on the order of 40 to 60 percent. By the end of 1973 the phosphorus level in the plant effluent must be reduced to 1.0 mg/l. Evidence indicates that approximately half of the phosphorus in the raw sewage, or on the order of 28 tons of phosphorus during 1972 originated from one industry, Decor Products Limited. This industry has been notified of this situation by the Town. Since normal chemical methods of removing phosphorus from the plant flow are seldom more than 90 percent efficient, the raw sewage phosphorus concentration should be kept below the 10 mg/l level in order to achieve an effluent concentration of 1.0 mg/l.

SLUDGE DIGESTION AND DISPOSAL

During the year a total of 1928 cubic yards of sludge was hauled from the plant by tank truck for land disposal. This represents a slight increase over the previous year.

CONCLUSIONS

Steps must be taken by the Town to ensure that phosphorus discharges from Decor Products are reduced to less than 10 mg/l.

Plant scale tests for phosphorus removal will be conducted in 1973 and permanent facilities for chemical feed will be installed before December 31, 1973.

It has been observed from other tests that when a plant is subject to high hydraulic loading chemical precipitation does not give increased removal of BOD and suspended solids.

Plant flows have increased steadily since 1970 and now average 120 percent of plant design. Difficulty in removing phosphorus under these high flow conditions and deterioration of plant efficiency as flows continue to increase can be expected. We therefore recommend that steps be taken to increase the plant capacity as soon as possible.

PROJECT COSTS NET CAPITAL COST \$822,029.32 DEDUCT - Portion financed by CMHC (496, 399, 44)Long Term Debt to MOE \$325,629.88 Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972 \$ 56, 255.21 Net Operating \$ 43, 146.33 Debt Retirement 3,838.00 Reserve 4,074.26 Interest Charged 18, 260.99 TOTAL \$ 69, 319.58 RESERVE ACCOUNT Balance @ January 1, 1972 \$ 31,943.28 Deposited by Municipality 4,074.26 Interest Earned 2, 149.83 \$ 38, 167.37

Less Expenditures

\$38,167.37

Balance @ December 31, 1972

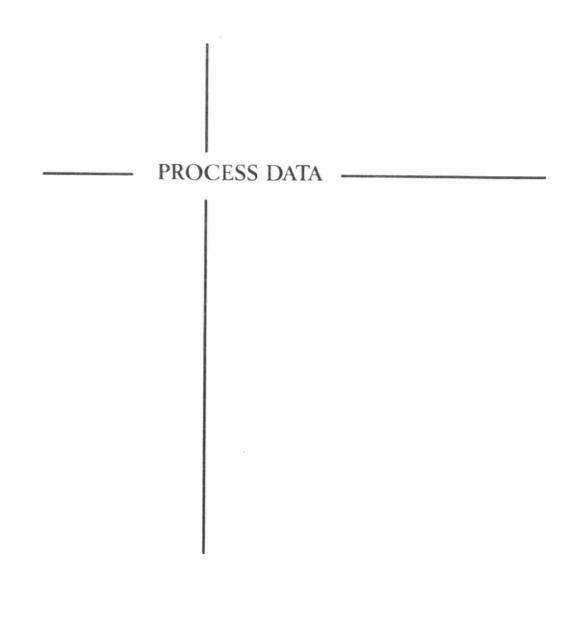
OPERATING COSTS 1972 COSTS ₱ PAYROLL 49 % FUEL 2 % POWER 9 % CHEMICALS GENERAL SUPPLIES TOTAL ANNUAL COST 4 % EQUIPMENT ■ REPAIRS & MAINTENANCE 13 % NET OPERATING 62 % SUNDRY 14 % DEBT RETIREMENT 6 % ● WATER RESERVE 6 % TRAVEL 1 % INTEREST 26 % YEARLY OPERATING COSTS SEWAGE TREATED TOTAL TREATMENT COSTS YEAR in million gallons OPERATING COSTS \$ per million gal & per Ib BOD 1968 497.54 \$28, 281.17 \$56.84 17 cents 1969 488.035, 187, 35 72.1126 cents 1970 485.4 34,075.73 70.20 14 cents 1971 511.037,863.28 74.10 24 cents 1972 546.6 43, 146.33 78.90 22 cents

MONTHLY OPERATING COSTS

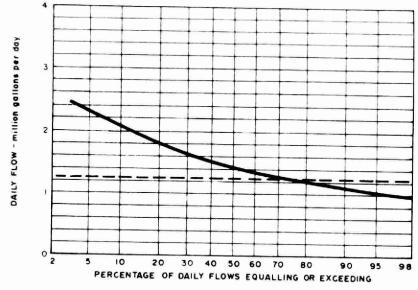
монтн	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and	SUNDRY*	WATER	TRAVEL
JAN	2267.21	1445.73		92.07	322.10		92.48		36.29		230.25	
FEB	2727.39	1482.33		97.57	332,68		98.69		189.31	516.81		
MAR	2786.09	1463.11	13.83	100.77	308.53		144.75		218.37	536.73		
APR	2744. 43	1475.97		75.37	296.68		163.81		386.79	240.71		5.10
MAY	3377.02	1616.30		43.02	347.88		62.57	(466.46)	1386.96	20.60	195.80	170.35
JUNE	3431.32	2135.20	167.71		138.95		220.15		213.09	556.22		
JULY	1502.25	38.91		36.03	371.88		103.95		924.78	26.70		
AUG	3627.84	1799.96	224.23	39.86	221.95	824.60	170.91		41.64	304.69		
SEPT	5725.49	1437.01	84.48	60.52	270.73	78.96	124, 29	1723.73	50.37	1861.05		34, 35
ост	2735.68	2265.94	67.02		257.40		103.77		(6.49)	48.04		
NOV	1774.60	77.57		101.56	323.50		17.32		265.00	658.15	219.65	111.85
DEC	10457.01	5575.49	(21.59)	78.47	625,00	778.12	363.56	206.90	1689.90	1157.56		3, 60
TOTAL	43146.33	20813.52	535.68	725.24	3817.28	1681.68	1666.25	1464.17	5496.01	5975.55	645.70	325.25

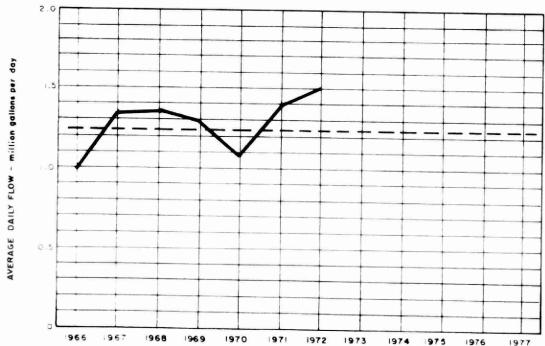
Brackets indicate credit.

^{*} Sundry includes sludge haulage costs of \$4,560.80



FLOWS



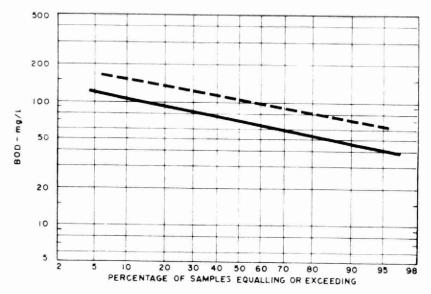


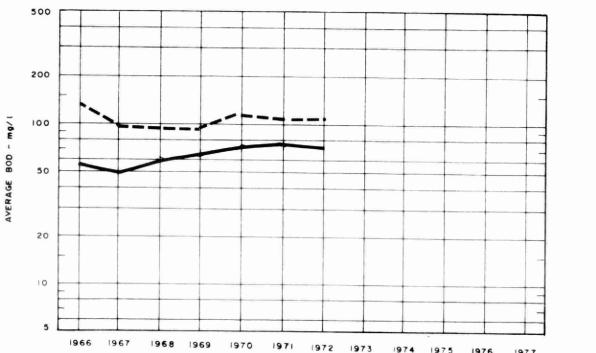
DESIGN CAPACITY _____

PLANT PERFORMANCE

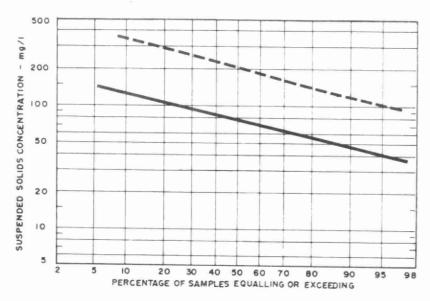
	FLOWS			BIOCHEA	AICAL OXYO	SEN D	EMAND	SU	SPENDED	SOLID	S	PHOSPHORUS		
MONTH	TOTAL FLOW	AVERAGE	MAXIMUM	INFLUENT	EFFLUENT	REDI	JCTION	INFLUENT	EFFLUENT	RED	UCTION	INFLUENT	EFFLUENT	
MONTH	million gallons	DAY mil. gal	DAY mgd	mg/l	mg/L	%	10 ³ pounds	mg/l	mg/l	%	10 ³ pounds	_mg/L P	mg/LP	
JAN	39.7	1.3	1.6	103	80	22	9.1	285	85	70	79.3	40	33	
FEB	35.4	1.2	1.4	130	100	23	10.6	225	110	51	41.7	12	11	
MAR	44.7	1.4	2.1	118	82	30	16.1	337	98	71	106.8	26	19	
APR	72.6	2.4	4.2	63	58	8	3.6	175	95	43	58.1	10	9	
MAY	49.6	1.6	2.4	90	70	22	9.9	215	70	67	71.9	52	40	
JUNE	41.7	1.4	2.4	110	70	36	16.7	210	70	67	58.4	28	19	
JULY	39.7	1.3	1.8	120	28	77	36.5	150	65	57	33.7	11	9	
AUG	43.7	1.4	1.9	170	80	53	39.4	80	28	65	22.7	9	9	
SEPT	42.3	1.4	1.9	100	78	22	9.3	195	60	69	57.1	14	13	
ост	46.3	1.5	2.3	100	53	47	21.8	250	60	76	88.0	21	21	
NOV	45.9	1.5	2.6	100	80	20	9,2	305	80	74	103.3	22	18	
DEC	45,0	1.4	2.1	90	62	31	12.6	170	110	35	27.0	16	19	
TOTAL	546.6	-	-	-	-	-	194.8	_	-	-	728.0	-	-	
AVG.	-	1.5	MAXIMUM 4.2	105	70	33	16.2	223	80	64	60.7	22	19	
No. of Samples	-	-	-	22	22	_	-	22	22	_	-	22	22	

BIOCHEMICAL OXYGEN DEMAND

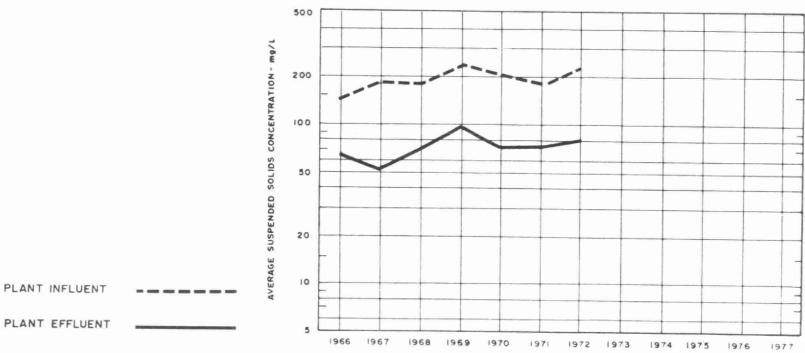




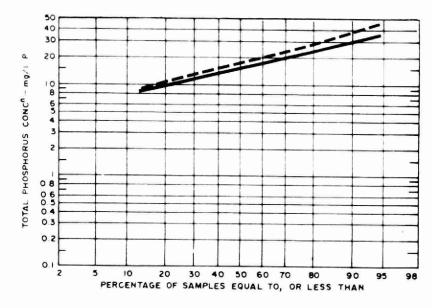
PLANT INFLUENT -----

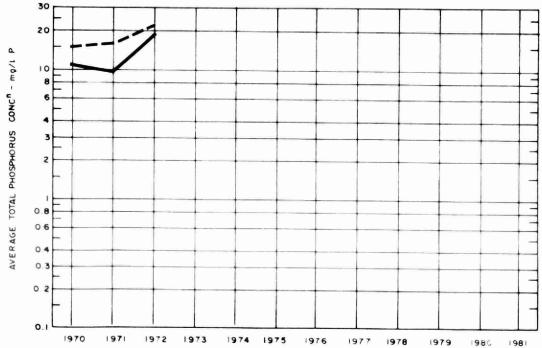


SUSPENDED SOLIDS



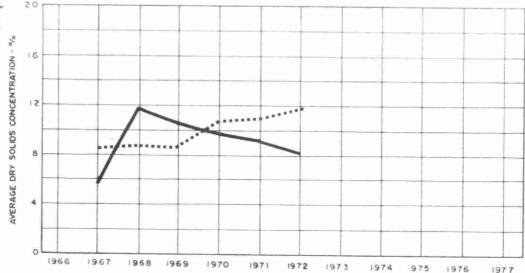
PHOSPHORUS



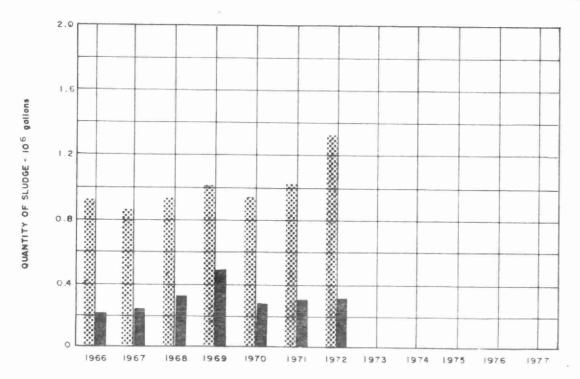


PLANT INFLUENT -----

DIGESTION ... PAKENGE DRY SOLDS CONCENTRATION ...



DIGESTED SLUDGE -



RAW SLUDGE TO DIGESTER DIGESTED SLUDGE REMOVED

TREATMENT DATA

	GRIT	CHLORINA	TION			SLUDGE	DIGESTION	and DIS	POSAL		
монтн	QUANTITY REMOVED cubic feet	CHLORINE USED 10 3 pounds	AVERAGE DOSAGE mg/l	QUANTITY JO gailons	Y SLUDGE TOTAL SOLIDS %	VOLATILE SOLIDS %	QUANTITY REMOVED IO 3 gallons	TED SLUDO TOTAL SOLIDS %	VOLATILE SOLIDS %	SUPERNATANT TOTAL SOLIDS %	SLUDGE HAULED cubic yards
JAN	20	2.7	6.9	99	12.8	40	30	7.8	32	2.6	180
FEB	13	2.4	6.8	92	12.8	42	23	6.7	-	3.0	138
MAR	26	2.8	6.2	102	19.2	38	20	8.8	29	2.7	120
APR	166	3.2	4.4	119	16.0	38	18	11.0	28	4.3	108
MAY	79	2.8	5.6	109	13.5	75	28	9.6	40	. 5	168 '
JUNE	271	2.9	7.0	175	-	-	30	7.6	31	-	180
JULY	103	2.6	6.5	98	7.6	53	30	7.0	_	. 2	180
AUG	120	3.0	6.7	108	-	-	38	9.8	38	-	224
SEPT	71	3.1	7.2	104	11.4	44	32	8.8	54	.9	189
ост	50	2.9	6.3	113	9.3	42	36	8,7	28	2.0	210
NOV	65	3.0	6.5	102	7.7	44	26	8.0	-	3.1	154
DEC	82	3.2	7.0	108	8.8	47	13	3.5	32	2.2	77
TOTAL	1066	34.6		1329		_	324	_	-	-	1928
AVG.	2.0 cubic feet/mil gal	2,9	6.3	111	11.9	46	27	8.1	34	2.0	161

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